What is claimed is:

1. A method of fabricating a long-wavelength vertical cavity surface emitting laser comprising the steps of:

depositing a long wave-length active region on a compatible substrate, the long wave-length active region having a first major surface;

depositing a first mirror stack on the first major surface of the long wave-length active region so as to define a major surface of the first mirror stack;

affixing a supporting substrate to the major surface of the first mirror stack;

removing the compatible substrate to expose an opposed second major surface of the long wave-length active region; and

depositing a second mirror stack on the second major surface of the long wave-length active region.

2. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing the long wave-length active region on the compatible substrate includes epitaxially growing an indium phosphide based active region on an indium phosphide based substrate.

3. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing the first mirror stack includes depositing layers of material with good thermal conductivity.

4. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing layers of material with good thermal conductivity includes depositing layers of material with a thermal conductivity comparable to a lattice matched semiconductor distributed Bragg reflector.

5. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing a first mirror stack includes metamorphically growing a distributed Bragg reflector on the first major surface of the long wave-length active region.

6. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 5 wherein the step of metamorphically growing a distributed Bragg reflector includes metamorphically growing alternate layers of $Al_xGa_{1-x}As$ and $Al_yGa_{1-y}As$, where x in a range of from approximately 0.5 to 1 and y is in a range of from approximately 0 to 0.5.

7. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 6 wherein the step of metamorphically growing alternate layers of $Al_xGa_{1-x}As$ and $Al_yGa_{1-y}As$ includes growing an AlAs/GaAs distributed Bragg reflector on an InP long wave-length active region.

8. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of affixing the supporting substrate to the major surface of the first mirror stack includes bonding a supporting substrate approximately thermal-expansion matched to the first mirror stack.

9. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 8 wherein the step of bonding a supporting substrate includes bonding a mechanical InP substrate to the first mirror stack.

10. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of affixing the supporting substrate to the major surface of the first mirror stack includes depositing a supporting layer of heat conducting material on the major surface of the first mirror stack.

11. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 10 wherein the supporting layer of heat conducting material is not thermal-expansion matched to the compatible substrate.

12. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing the supporting layer of heat conducting material on the major surface of the first mirror stack includes depositing metal.

13. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 12 wherein the step of depositing metal includes depositing one of copper, silver, gold, nickel, and aluminum.

14. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 wherein the step of depositing the second mirror stack includes depositing one of a distributed Bragg reflector and a dielectric mirror stack.

15. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 14 wherein the step of depositing the second mirror stack includes depositing layers of material with good temperature conductivity.

16. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 including in addition a step of forming a light inlet opening through the supporting substrate for optically pumping the long-wavelength vertical cavity surface emitting laser.

17. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 1 including in addition a step of forming at least one of the long wave-length active region and the second mirror stack to provide index guiding for the long-wavelength vertical cavity surface emitting laser.

18. A method of fabricating a long-wavelength vertical cavity surface emitting laser comprising the steps of:

depositing an InP based long wave-length active region on an InP based substrate, the long wave-length active region having a first major surface;

depositing a metamorphic distributed Bragg reflector on the first major surface of the long wave-length active region so as to define a major surface of the distributed Bragg reflector;

affixing a supporting substrate to the major surface of the distributed Bragg reflector;

removing the InP based substrate to expose an opposed second major surface of the long wave-length active region; and

depositing a second mirror stack on the second major surface of the long wave-length active region.

19. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of depositing a metamorphic distributed Bragg reflector includes depositing alternate layers of $Al_xGa_{1-x}As$ and $Al_yGa_{1-y}As$, where x in a range of from approximately 0.5 to 1 and y is in a range of from approximately 0 to 0.5.

20. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of depositing a metamorphic distributed Bragg reflector includes depositing alternate layers of micro-crystalline silicon and micro-crystalline silicon carbide.

21. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of depositing a metamorphic distributed Bragg reflector includes depositing alternate layers of micro-crystalline silicon and micro-crystalline aluminum oxide.

22. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of affixing the supporting substrate includes affixing one of a supporting layer of heat conducting material and an InP based substrate.

23. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of affixing the supporting layer of heat conducting material includes plating metal.

24. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 23 wherein the step of plating metal includes plating one of copper, silver, gold, nickel, and aluminum.

25. A method of fabricating a long-wavelength vertical cavity surface emitting laser as claimed in claim 18 wherein the step of depositing the second mirror stack includes depositing one of a metamorphic distributed Bragg reflector and a dielectric mirror stack.

26. A long-wavelength vertical cavity surface emitting laser comprising:

a long wave-length active region having a first major surface;

a metamorphic distributed Bragg reflector grown on the first major surface of the long wave-length active region so as to define a major surface of the metamorphic distributed Bragg reflector;

a supporting substrate mechanically bonded to the major surface of the metamorphic distributed Bragg reflector; and

a mirror stack positioned on an opposed second major surface of the long wave-length active region.

27. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the long wave-length active region includes an indium phosphide based active region.

28. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the metamorphic distributed Bragg reflector includes layers of material with good thermal conductivity.

29. A long-wavelength vertical cavity surface emitting laser as claimed in claim 28 wherein the layers of material with good thermal conductivity include layers of material with a thermal conductivity comparable to a lattice matched semiconductor distributed Bragg reflector.

30. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the metamorphic distributed Bragg reflector includes layers of $Al_xGa_{1-x}As/Al_yGa_{1-y}As$, where x in a range of from approximately 0.5 to 1 and y is in a range of from approximately 0 to 0.5, grown on the indium phosphide based long wave-length active region.

31. A long-wavelength vertical cavity surface emitting laser as claimed in claim 30 wherein the metamorphic distributed Bragg reflector includes layers of AlAs/GaAs metamorphically grown on the indium phosphide based long wave-length active region.

32. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the supporting substrate includes a supporting substrate approximately thermally matched to the metamorphic distributed Bragg reflector.

33. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the supporting substrate is approximately thermal-expansion matched to the metamorphic distributed Bragg reflector.

34. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the supporting substrate includes a mechanical InP substrate bonded to the metamorphic distributed Bragg reflector.

35. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the supporting substrate includes a supporting layer of heat conducting material plated on the major surface of the metamorphic distributed Bragg reflector.

36. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the supporting layer of heat conducting material includes one of copper, silver, gold, nickel, and aluminum.

37. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 wherein the mirror stack includes one of a distributed Bragg reflector and a dielectric mirror stack.

38. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 including in addition a light inlet opening through the supporting substrate for optically pumping the long-wavelength vertical cavity surface emitting laser.

39. A long-wavelength vertical cavity surface emitting laser as claimed in claim 26 including in addition at least one of the long wave-length active region and the mirror stack being formed to provide index guiding for the long-wavelength vertical cavity surface emitting laser.